WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a semiconductor substrate having a main surface; and

an element isolation trench formed on said main surface of said semiconductor substrate, wherein

the trench width of an upper end of said element isolation trench is larger than the trench width of a bottom surface while the length of a side surface located between said upper end and an end of said bottom surface is larger than the length of a straight line connecting said upper end and said end of said bottom surface.

2. The semiconductor device according to claim 1, wherein

the section of at least a central portion of said side surface of said element isolation trench exhibits a curved shape having an angle of inclination gradually steepened toward a downward direction perpendicular to said main surface of said semiconductor substrate.

3. The semiconductor device according to claim 2, wherein

the section of said side surface of said element isolation trench substantially has an S shape.

4. The semiconductor device according to claim 2, wherein

the section of a part of said side surface of said element isolation trench close to said upper end is formed to be substantially perpendicular to said main surface of said semiconductor substrate.

5. The semiconductor device according to claim 2, wherein

the section of a part of said side surface of said element isolation trench close to said bottom surface is formed to be substantially perpendicular to said main surface of said semiconductor substrate.

6. The semiconductor device according to claim 1, wherein

said side surface of said element isolation trench includes:

a first side surface located in the vicinity of said upper end of said element isolation trench and formed to be substantially perpendicular to said main surface of said semiconductor substrate,

a second side surface located in the vicinity of said bottom surface of said element isolation trench and formed

to be substantially perpendicular to said main surface of said semiconductor substrate, and

a substantially linearly inclined third side surface connecting said first side surface and said second side surface with each other.

7. The semiconductor device according to claim 1, wherein

an insulator is embedded in said element isolation trench.

8. A method of fabricating a semiconductor device comprising steps of:

forming an etching mask on a prescribed region of a main surface of a semiconductor substrate; and

forming an element isolation trench by etching said semiconductor substrate through said etching mask, wherein

said step of forming said element isolation trench includes a step of forming said element isolation trench under an etching condition more readily forming a sidewall protective film in an opening of said semiconductor substrate than an etching condition for forming an element isolation trench having a side surface substantially perpendicular to said main surface of said semiconductor substrate and under such an etching condition that etching

gas self-controllably reduces a reduction ratio of the trench width due to reduction of an etching area following reduction of the trench width when performing etching to gradually reduce the width of said element isolation trench.

9. The method of fabricating a semiconductor device according to claim 8, further comprising steps of:

forming a silicon oxide film on said main surface of said semiconductor substrate and thereafter forming a silicon nitride film for defining said etching mask on said silicon oxide film,

anisotropically etching prescribed regions of said silicon nitride film and said silicon oxide film thereby patterning said silicon nitride film and said silicon oxide film, and

also anisotropically etching a surface of said semiconductor substrate when anisotropically etching said prescribed regions of said silicon nitride film and said silicon oxide film thereby forming an opening having a side surface substantially perpendicular to said main surface of said semiconductor substrate,

in advance of said step of forming said element isolation trench.

10. The method of fabricating a semiconductor device according to claim 8, wherein

the section of at least a central portion of said side surface of said element isolation trench is formed to exhibit a curved shape having an angle of inclination gradually steepened toward a downward direction perpendicular to said main surface of said semiconductor substrate.

11. The method of fabricating a semiconductor device according to claim 10, wherein

the section of said side surface of said element isolation trench is formed to substantially have an S shape.

12. The method of fabricating a semiconductor device according to claim 10, wherein

the section of a part of said side surface of said element isolation trench close to said upper end is formed to be substantially perpendicular to said main surface of said semiconductor substrate.

13. The method of fabricating a semiconductor device according to claim 10, wherein

the section of a part of said side surface of said

element isolation trench close to said bottom surface is formed to be substantially perpendicular to said main surface of said semiconductor substrate.

14. The method of fabricating a semiconductor device according to claim 8, further comprising a step of embedding an insulator in said element isolation trench.

15. A method of fabricating a semiconductor device comprising steps of:

forming an etching mask on a prescribed region of a main surface of a semiconductor substrate;

forming a first side surface substantially perpendicular to said main surface of said semiconductor substrate by anisotropically etching said semiconductor substrate through said etching mask;

thereafter switching an etching condition to an etching condition more readily forming a sidewall protective film in an opening of said semiconductor substrate for etching said semiconductor substrate thereby forming a second side surface; and

thereafter switching said etching condition to an anisotropic etching condition for anisotropically etching said semiconductor substrate thereby forming a third side surface substantially perpendicular to said main surface

of said semiconductor substrate.

16. The method of fabricating a semiconductor device according to claim 15, further comprising steps of:

forming a silicon oxide film on said main surface of said semiconductor substrate and thereafter forming a silicon nitride film for defining said etching mask on said silicon oxide film,

anisotropically etching prescribed regions of said silicon nitride film and said silicon oxide film thereby patterning said silicon nitride film and said silicon oxide film, and

also anisotropically etching a surface of said semiconductor substrate when anisotropically etching said prescribed regions of said silicon nitride film and said silicon oxide film thereby forming an opening having a side surface substantially perpendicular to said main surface of said semiconductor substrate,

in advance of said step of forming said element isolation trench.

17. The method of fabricating a semiconductor device according to claim 15, further comprising a step of embedding an insulator in said element isolation trench.